TESLA K20 GPU ACCELERATOR

BD-06455-001_v05 | November 2012

Board Specification

DOCUMENT CHANGE HISTORY

BD-06455-001_v05

Version	Date	Authors	Description of Change
01	August 1, 2012	GG, SM	Preliminary Information (Information contained within this document is subject to change)
02	September 6, 2012	GG, SM	• Updated "Key Features" section • Updated Figure 1 • Updated Table 1 • Updated "Standard I/O Connector Placement" section
03	September 7, 2012	GG, SM	• Updated Table 4 • General edits throughout this specification
04	October 9, 2012	GG, SM	• Changed Gen3 to Gen2 • Updated block diagram (Figure 1) • Added memory bandwidth • Changed idle power to 25 W
05	November 9, 2012	GG, SM	• Removed "Preliminary Information" from document as this board specification is now final • Removed "NVIDIA Confidential" from document • Updated package size • Updated block diagram (Figure 1)

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OVERVIEW

The NVIDIA® Tesla® K20 graphics processing unit (GPU) accelerator is a PCI Express, dual-slot full height (4.376 inches by 10.5 inches by 1.52 inches) form factor computing module comprising of a single GK110 GPU. The Tesla K20 is designed for servers and offers a total of 5 GB of GDDR5 on-board memory and supports PCI Express Gen2.

The Tesla K20 can be configured by the OEM or by the end user to enable or disable ECC or error correcting codes that can fix single-bit errors and detect double-bit errors. Enabling ECC will cause some of the memory to be used for the ECC bits, so the user available memory will decrease by 10%. On the Tesla K20, the register files, cache, and DRAM are ECC protected.

KEY FEATURES

GPU

- Number of processor cores: 2496
- Processor core clock: 706 MHz
- Package size: 45 mm × 45 mm 2397-pin ball grid array (S-FCBGA)

Board

- PCI Express Gen2 ×16 system interface
- Physical dimensions: 4.376 inches × 10.5 inches, dual-slot

Display Connectors

- None

Power Connectors

- One 6-pin PCI Express power connector
- One 8-pin PCI Express power connector

Memory

- Memory clock: 2.6 GHz
- Memory bandwidth: 208 GB/sec
- Interface: 320-bit
  - Total board memory: 5 GB
  - 20 pieces of 64M × 16 GDDR5, SDRAM

BIOS

- 2Mbit Serial ROM

TESLA K20 BLOCK DIAGRAM

Figure 1 is the block diagram for the Tesla K20 GPU dual-slot computing processor module.

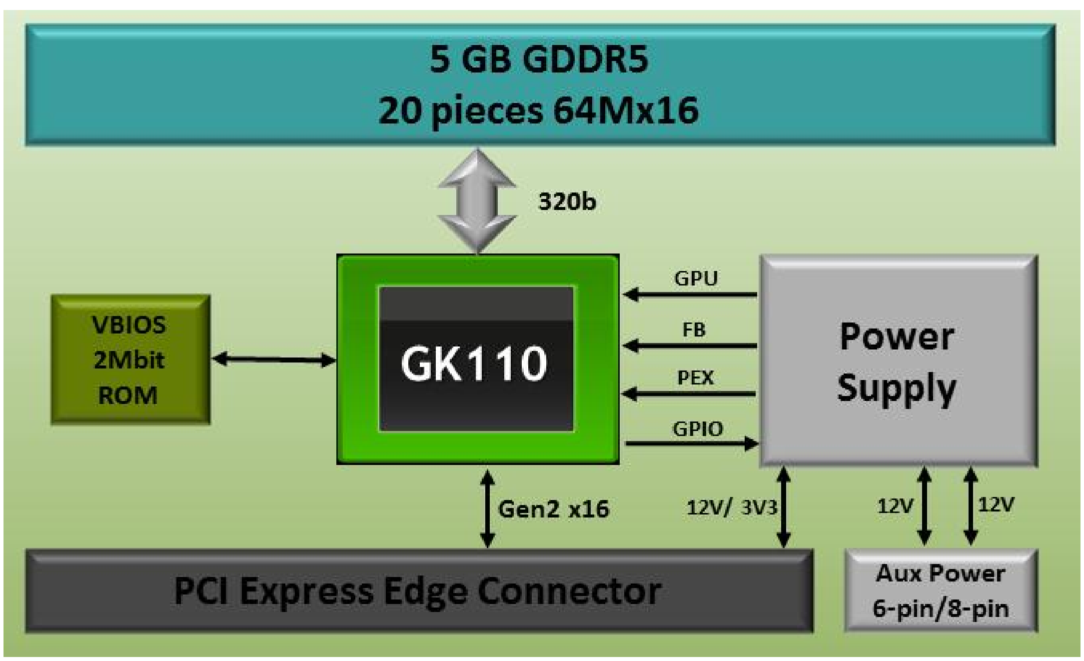


Figure 1. Tesla K20 Block Diagram

CONFIGURATION

The Tesla K20 board is available in the following configuration (Table 1).

Table 1. Board Configuration

Specifications	Tesla K20
Generic SKU reference	699-22081-0208-xxxx
Chip	GK110
Package size GPU	45 mm × 45 mm 2397-pin S-FCBGA
Processor clock	706 MHz
Memory clock	2.6 GHz
Memory size	5 GB
Memory I/O	320-bit GDDR5
Memory configuration	20 pieces of 64M ×16 GDDR5 SDRAM
Display connectors	None
Power connectors	• 8-pin PCI Express power connector • 6-pin PCI Express power connector
Board power	225 W
Idle power	25 W
Thermal cooling solution	Passive heat sink

MECHANICAL SPECIFICATIONS

PCI EXPRESS SYSTEM

The Tesla K20 board (Figure 2) conforms to the PCI Express full height (4.376 inches by 10.5 inches) form factor.

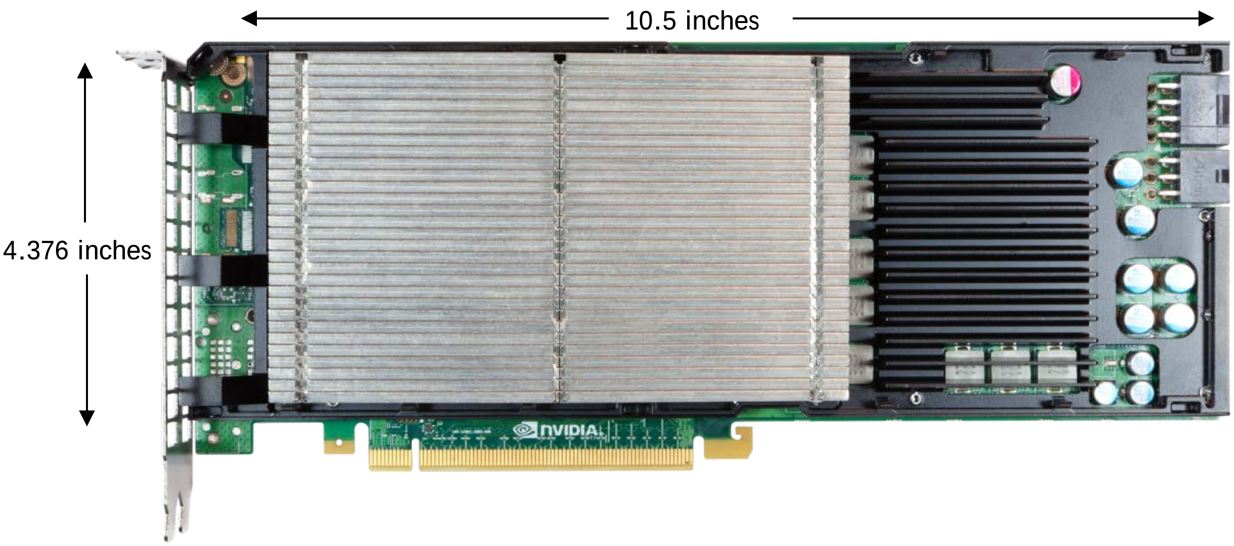


Figure 2. Tesla K20 GPU Accelerator

Note: The final product will ship with shroud.

TESLA K20 BRACKET

As shown in Figure 3, the Tesla K20 includes a vented bracket. If you are an OEM who qualifies for bracket modifications, you have the option of receiving your module with no bracket installed.



Figure 3. Tesla K20 Bracket

POWER CONNECTORS

The Tesla K20 GPU accelerator is a performance optimized, high-end product and uses power from the PCI Express connector as well as external power connectors.

Figure 4 and Figure 5 show the specifications and Table 2 and Table 3 show the pinouts for the 6-pin and 8-pin PCI Express power connectors.

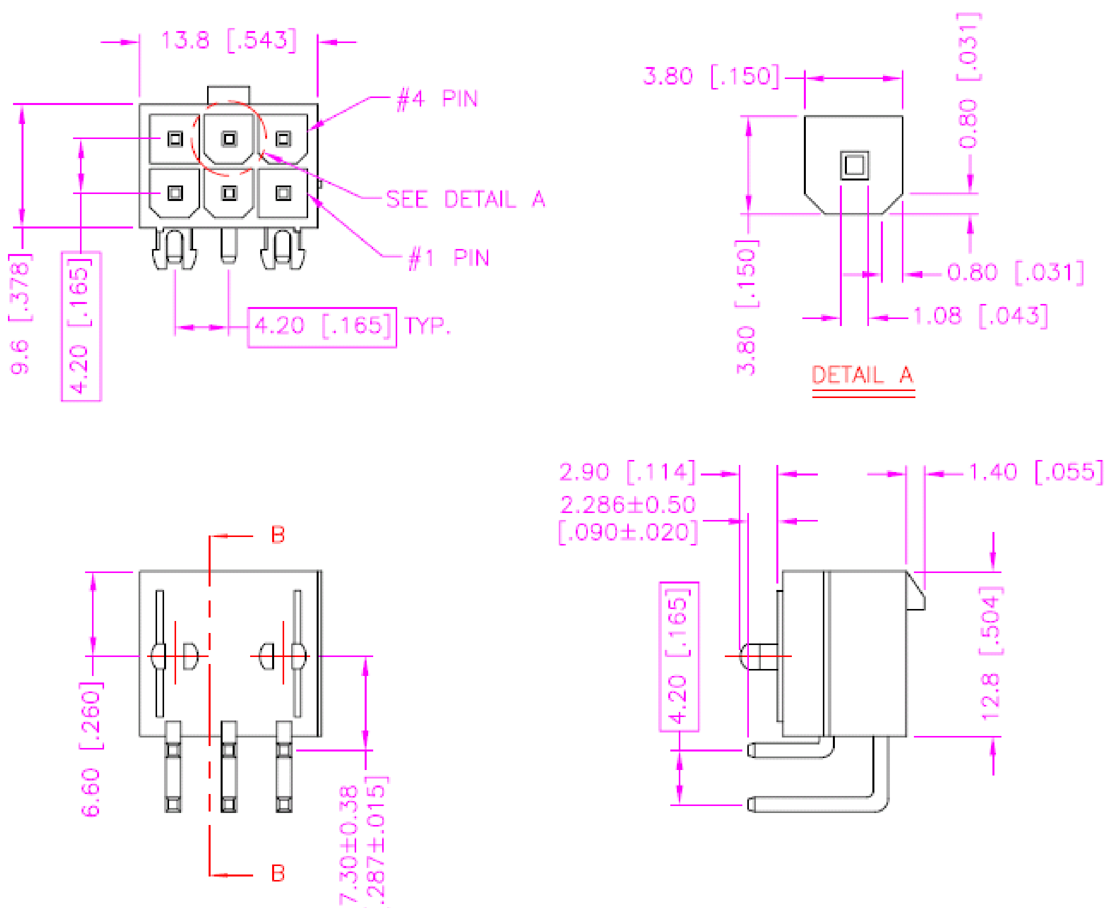


Figure 4. 6-Pin PCI Express Power Connector

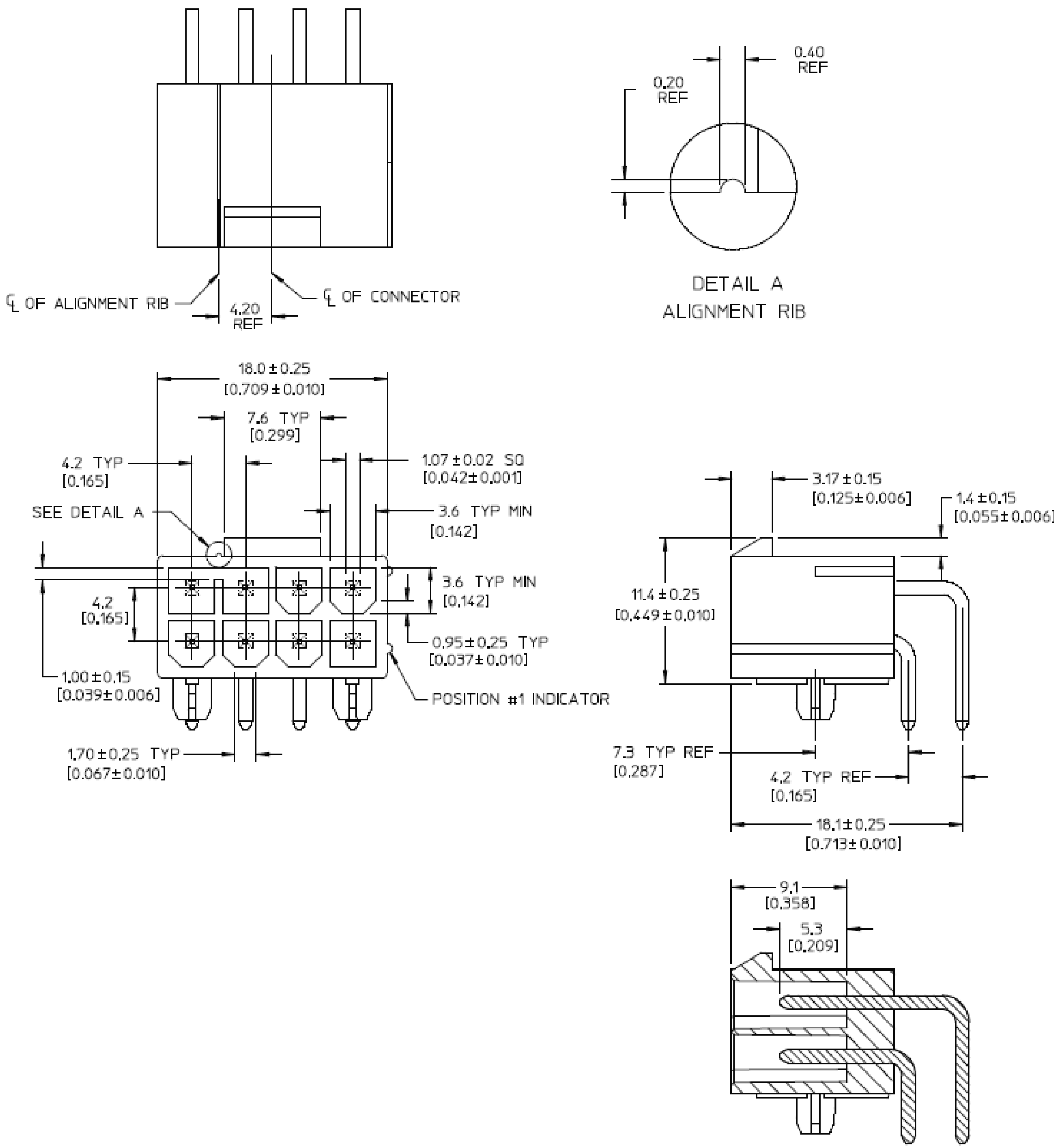


Figure 5. 8-Pin PCI Express Power Connector

Table 2. 6-Pin PCI Express Power Connector Pinout

Pin Number	Description
1	+12 V
2	+12 V
3	+12 V
4	GND
5	Sense
6	GND

Table 3. 8-Pin PCI Express Power Connector Pinout

Pin Number	Description
1	+12 V
2	+12 V
3	+12 V
4	Sense1
5	GND
6	Sense0
7	GND
8	GND

POWER SPECIFICATIONS

The Tesla K20 GPU accelerator requires power from the PCI Express connector as well as one or two auxiliary power connectors.

Table 4. Auxiliary Power Connectors

8-Pin Header	6-Pin Header	Support	Notes
Connect 8-pin cable	Connect 6-pin cable	Yes	
Connect 8-pin cable	No cable installed	Yes	8-pin cable must supply 150 W
Connect 6-pin cable	Connect 6-pin cable	No	8-pin connector should always be connected

Note: Detailed information about power draw by rail will be available to authorized system partners in the *Tesla K20 System Design Guide*.

SUPPORT INFORMATION

CERTIFICATES AND AGENCIES

Agencies

- Australian Communications Authority and Radio Spectrum Management Group of New Zealand (C-Tick)
- Bureau of Standards, Metrology, and Inspection (BSMI)
- Conformité Européenne (CE)
- Federal Communications Commission (FCC)
- Industry Canada - Interference-Causing Equipment Standard (ICES)
- Korean Communications Commission (KCC)
- Underwriters Laboratories (cUL)
- Voluntary Control Council for Interference (VCCI)

LANGUAGES

Table 5. Languages Supported

	Windows Server 2008 and Windows Server 2008 R2	Linux
English (US)	X	X
English (UK)	X	
Arabic	X	
Chinese, Simplified	X	
Chinese, Traditional	X	
Danish	X	
Dutch	X	
Finnish	X	
French	X	
French (Canada)	X	
German	X	
Italian	X	
Japanese	X	
Korean	X	
Norwegian	x	
Portuguese (Brazil)	X	
Russian	X	
Spanish	X	
Spanish (Latin America)	X	
Swedish	X	
Thai	X	

Note: NVIDIA's CUDA™ software is only supported in English (U.S.)

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